



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/803,221	03/18/2004	Shigenori Ito	811_045	5630

25191 7590 03/12/2007  
BURR & BROWN  
PO BOX 7068  
SYRACUSE, NY 13261-7068

EXAMINER
----------

CREPEAU, JONATHAN

ART UNIT	PAPER NUMBER
----------	--------------

1745

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/12/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	10/803,221		ITO ET AL.	
	<b>Examiner</b>		<b>Art Unit</b>	
	Jonathan S. Crepeau		1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 28 December 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 34 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 34 is/are allowed.
- 6) ☒ Claim(s) 1-3 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>2/20/07</u> .   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

1. This Office action addresses claims 1-3 and 34. Claim 34 remains allowed and claims 1-3 remain rejected under 35 USC 103 for substantially the reasons of record. Accordingly, this action is made final.

### ***Claim Rejections - 35 USC § 103***

2. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishi et al (U.S. Pre-Grant Publication No. 2001/0038936) in view of Tannenberger et al (U.S. Patent 5,328,779).

As shown in Figure 44(b), Nishi et al. is directed to layered solid oxide fuel cells comprising an air electrode (15) interconnector (14), fuel electrode (12) and substrate (11). The “entire main surface” of each electrode is contacted by the electrolyte. The electrolyte may comprise yttrium-stabilized zirconia (YSZ), the fuel electrode may comprise a NiO/YSZ system material, and the air electrode may comprise a lanthanum manganese system material (see paragraph 3). The latter fairly suggests the claimed “lanthanum-containing perovskite-type complex oxide.” The fuel cell laminates of the reference can be made by a printing or coating step, a cold pressing step, and a co-sintering step (see pars. 0019, 0082 of the reference).

Nishi et al. do not expressly teach that the porous air or fuel electrode have a thickness of at least 300 microns, or that the electrolyte has a thickness of less than 25 microns, as recited in claim 1. The reference further does not teach that the laminated sintered bodies have an area of 60 square centimeters as recited in claim 2.

However, the artisan would be motivated to use a relatively thick fuel or air electrode and a relatively thin electrolyte in the apparatus of Nishi. A thicker electrode would provide increased mechanical strength, while a thinner electrolyte would provide decreased internal resistance. It has been held that the discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980). As such, the claimed thicknesses are not considered to distinguish over the reference. Regarding claim 2, the recitation of an absolute size (surface area) of the sintered body is also not considered to distinguish over the reference. Generally, an artisan would be able to scale up or down the size of an apparatus depending on its intended use, among other factors. See MPEP 2144.04.

Nishi et al. further do not expressly teach the claimed helium leakage rate of the zirconia electrolyte layer as recited in claim 1.

Tannenberger et al. is directed to a fuel cell comprising an electrolyte layer (2) comprising YSZ. The electrolyte layer a helium leakage rate of  $10^{-6}$  mbar.l/cm.s (see col. 6, line 20).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use a YSZ

electrolyte in the fuel cell of Nishi et al. having the helium leakage rate disclosed by Tannenberger et al. In column 4, line 16, Tannenberger et al. disclose that “advantageously, the electrolyte layer produced by the process according to the invention has a layer thickness optimized for the oxygen ion conductivity and simultaneously the necessary gastightness.” As such, the artisan would be motivated to use a YSZ electrolyte in the fuel cell of Nishi et al having the helium leakage rate disclosed by Tannenberger et al. Although the units of the helium leakage rate disclosed by Tannenberger et al. are slightly different than the units recited in the instant claims, it is submitted that the disclosure of Tannenberger at least identifies the helium leakage rate as a result effective variable which may be optimized by the skilled artisan as stated above. Further, it is submitted that, absent evidence to the contrary, there would be a reasonable expectation that the range disclosed by the reference and the claimed range overlap. It is noted that the Tannenberger reference does not explicitly state how its helium leakage rate is measured, whereas the instant application discloses a specific method in [0124].

Regarding claim 3, this claim is considered to be product-by-process claim that does not produce a structure distinguishable from that of the references (MPEP 2113).

### ***Response to Arguments***

3. Applicant’s arguments filed December 28, 2006 have been fully considered but they are not persuasive. Applicants state that “even if, *arguendo*, the PTO should instead assert that the electrolyte 13 in Nishi’s Fig. 44(b) contacts the entire main surface of the air electrode 15,

Applicants respectfully submit that the electrolyte 13 still does not contact the entire main surface of the fuel electrode 12 or the substrate 11.” However, it appears that the fuel cell unit shown at the left side of Fig. 44(b) meets the claimed limitations. The entire main surface of air electrode 15 is contacted by the electrolyte, and the entire main surface of fuel electrode 12 is contacted by the electrolyte. The term “entire main surface” is construed broadly (e.g., the area of electrode 15 contacted by the interconnect does not have to be considered part of the “entire main surface”), and thus it is submitted that Fig. 44(b) of Nishi reads on the claim language.

Applicant further asserts with regard to Tannenberger that “one skilled in the art would not have had any motivation to attempt to reduce the standardized thickness of 100  $\mu\text{m}$ , already optimized for the necessary gas-tightness, all the way down to 25  $\mu\text{m}$  or less and would not have had any reasonable expectation of maintaining the gas-tightness so as to possibly provide a helium leakage rate of  $10^{-6} \text{ Pa m}^3/\text{s}$ .” In response, the position is maintained that the artisan would be sufficiently motivated to use a thickness of 25 microns or less while maintaining the helium leakage rate of  $10^{-6} \text{ Pa m}^3/\text{s}$  or less. While it is acknowledged that Tannenberger does disclose a thickness of 100 microns in the Table, the reference does not explicitly state how this value is arrived at. It is noted that in claim 12 of the patent, Tannenberger discloses that the electrolyte has a “thickness which does not exceed 100  $\mu\text{m}$ .” Thus, it is apparent that the invention of Tannenberger encompasses electrolyte thicknesses 100 microns and below. Therefore, the disclosure of a value of 100 microns in the Table may be viewed as merely exemplary of the invention, and not limiting of the invention. Thus, Applicant’s contention that the artisan would have to “reduce” the thickness of the electrolyte from 100 microns down to 25

microns is not persuasive. As stated above, thicknesses up to and including 100 microns are considered part of the invention of Tannenberger, and as such, the use of a thickness at the smaller end of the range (<25 microns) to increase ion conductivity would be obvious. Further, absent evidence to the contrary, i.e., that such a configuration would be non-enabling or inoperable, it would be obvious to set the helium leakage rate of this electrolyte to Tannenberger's standardized value of  $10^{-6}$  mbar.l/cm.s. Accordingly, the rejection as set forth under 35 USC 103 above is believed to be proper.

#### *Conclusion*

4. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

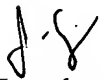
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Art Unit: 1745

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan, can be reached at (571) 272-1292. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jonathan Crepeau  
Primary Examiner  
Art Unit 1745  
March 7, 2007